

ABSTRACT OF THE DISCLOSURE

A method and system for real-time tracking of objects are disclosed. A region is repeatedly scanned providing a plurality of images or data sets having points corresponding to objects in the region to be tracked. Given a previously determined track for each object in the region, an M -dimensional combinatorial optimization assignment problem is formulated using the points from $M-1$ of the images or data sets, wherein each point is preferably used in extending at most one track. The M -dimensional problem is subsequently solved for an optimal or near-optimal assignment of the points to the tracks, extending the tracking of the objects so that a response to each object can be initiated by the system in real-time. Speed and accuracy is provided by an iterative Lagrangian Relaxation technique wherein a plurality of constraint dimensions are relaxed simultaneously to yield a reduced dimensional optimization problem whose solution is used to formulate an assignment problem of dimensionality less than M . The iterative reducing of dimensions terminates when exact solutions are determined for two-dimensional cases. A recovery procedure is used for determining a higher dimensional assignment problem solution from a problem having one less dimension. The procedure is useful when the reduced

dimensional optimizational problem has two constraint dimensions.